ATTACHMENT A

220 C.M.R. 151.00: RAIL FIXED GUIDEWAY SYSTEM: SAFETY SYSTEM PROGRAM STANDARD

Section

151.01: Purpose and Scope

(1) 220 C.M.R. §§ 151.00 et seq. establishes the standard of the Commonwealth of Massachusetts oversight required to implement the provisions of 49 U.S.C. 5330, and Title 49 of the Code of Federal Regulations, Part 659, Rail Fixed Guideway Systems, State Oversight.

(2) The Department of Telecommunications and Energy (Department) exercises jurisdiction over safety of equipment and operations of rail fixed guideway systems pursuant to M.G.L. c. 161A, § 3 (i).

(3) 220 C.M.R. 151.00 is applicable to the Massachusetts Bay Transportation Authority (Transportation Authority), the transit agency operating rail fixed guideway systems in the Commonwealth of Massachusetts.

(4) The Department and the Transportation Authority shall meet quarterly to discuss safety and security issues the months of January, April, July, and October.

(5) The Transportation Authority shall transmit to the Department a monthly

Safety Department Multi-Mode Review.

(6) The Department shall submit an Annual Report and Annual Certification of the Transportation Authority to the Federal Transit Administration ("FTA") on or before March 15th of each year.

(7) Revision(s) to the Program Standard by the Department must be submitted to the Transportation Authority within 30 days from Department promulgation. The Transportation Authority must acknowledge in writing receipt of the Program

Standard revision(s) and provide, within 60 days, a schedule for any required revision(s) to its SSPP.

(8) The Department will submit to the FTA any Program Standard revisions within 30 days of promulgation by the Department.

(9) The Department or its designee shall conduct an on-site Triennial Audit, starting in June 1999 and every three years after 1999, to verify compliance of the Transportation Authority with the SSPP and the SSP. Based on the Department's Triennial Audit Checklist, the Department shall make an evaluation of the SSPP and the SSP and will issue a report and recommendations. Implementation of the recommendations of the Triennial Audit shall be monitored according to the procedures set for in 220 C.M.R. 151.07(4). The Department will file this report with the FTA within 30 days of the completion of the Triennial Audit.

151.02: Definitions

Accident is defined as an event that occurs when

(a) an individual dies;

(b) an individual is injured and immediately receives medical treatment away from the scene; or

(c) a collision, derailment, or fire results in property damage in excess of $100,000.

Corrective Action Plan (CAP) is a plan to minimize, control, warn of, or eliminate any investigated hazardous condition within a specified time.

Guidelines means a minimum standard set by the Federal Transit Administration (FTA), including, but not limited to, American Public Transit Association's (APTA) "Manual for the Development of Rail Transit System Safety Program Plans" (1991).

Hazardous Condition means a condition that may endanger human life or property. It includes unacceptable hazardous conditions. Unacceptable Hazardous Condition means a hazardous condition determined to be an unacceptable hazardous condition under the Accident /Hazard Matrix set out at 220 C.M.R. 151.06(1)(c). Acceptable Hazardous Condition means a hazardous condition inherent to the operation of the transit system which, based on review and concurrence of the transit agency management and the Department, is impractical to eliminate, but may require special procedures to reduce risk of accident.

Internal Safety Audit Process (ISAP) means a formal audit process conducted by the Transportation Authority in conformance with the APTA Manual Checklist Number 9 to determine if all Transportation Authority organizational elements, equipment, procedure and functions are performing as intended within the scope of the SSPP. At a minimum, each of the 14 elements specified in Checklist Number 9 must be audited once every three years.

Rail Fixed Guideway System means any light, heavy, or rapid rail system, monorail, inclined plane, funicular, trolley or automated guideway that is:

(a) Included in the FTA's calculation of fixed guideway route miles or receives funding under the FTA's formula program for urbanized areas; and

(b) Not regulated by the Federal Railroad Administration.

Safety means freedom from danger.

Security means freedom from intentional danger.

System Safety Program Standard (SSPS) means the standard developed and adopted by the Department, which, at a minimum, complies with the American Public Transit

Association (APTA) Guidelines and which addresses the safety and security of passengers and employees.

System Safety Program Plan (SSPP) means a document adopted by the Transportation Authority setting forth its safety policies, objectives, responsibilities, and procedures.

System Security Plan (SSP) means a document adopted by the Transportation Authority setting forth its security policies, objectives, responsibilities, and procedures.

Transportation Authority means the entity operating a rail fixed guideway system.

151.03 System Safety Program Plan

(1) The Transportation Authority shall prepare a system safety program plan (SSPP). The SSPP shall conform to the FTA Guidelines and to 220 C.M.R. 151.00.

The SSPP shall address the personal safety of the Transportation Authority's passengers according to the guidelines set forth in the American Public Transit Association (APTA) MANUAL FOR THE DEVELOPMENT OF RAIL TRANSIT SYSTEM SAFETY PROGRAM PLANS.

(2) The SSPP shall describe:

(a) The procedure for communication between the Transportation Authority and the Department and for on-site safety reviews by the Department.

(b) The procedure for investigating accidents and hazardous condition.

(c) The procedure for reporting accidents and unacceptable hazardous conditions to the Department.

(d) The procedure for submitting CAPs to the Department.

(e) The procedure for conducting internal safety audits and submitting reports to the Department.

(3) The Department shall:

(a) Review the Transportation Authority's SSPP based on the SSPP Checklist provided by the Department. The Department will review only the final draft bearing the required signatures of the Transportation Authority's management.

(b) After a satisfactory review, the Department shall approve the SSPP, and so advise the Transportation Authority, in writing within 30 days.

(c) Review and approve on or before September first of each year, the revised SSPP submitted by the Transportation Authority.

(d) Be notified in writing, on or before September first of each year, in the event that after the Transportation Authority's annual review, there are no revisions to the SSPP.

(e) Require within 30 days an update of the Transportation Authority's SSPP at any time.

(4) The Department may perform inspections, investigations and reviews of the operation and maintenance of the Transportation Authority's rail fixed guideway system to determine whether the safety procedures of the Transportation Authority comply with the SSPP.

151.04 System Security Program

(1) The Transportation Authority shall prepare a System Security Plan (SSP). The SSP shall conform to the FTA Guidelines and to 220 C.M.R. 151.00.

(2) The SSP shall address:

(a) The personal security of the Transportation Authority's passengers.

(b) The personal security of the Transportation Authority's employees.[(1)]

(c) The guidelines set forth in FTA-MA-90-700-1-94-1. TRANSIT SYSTEM SECURITY PROGRAM PLANNING GUIDE.

(3) The SSP shall describe:

(a) The procedure for communication between the Transportation Authority and the Department and for on-site security reviews by the Department.

(b) The procedure for investigating security conditions.

(c) The procedure for reporting security issues to the Department.

(d) The procedure for submitting security CAPs to the Department.

(e) The procedure for conducting internal security audits and submitting reports to the Department.

(4) The Transportation Authority shall:

(a) Submit a revised SSP to the Department for its review and approval on or before March first of each year.

(b) In the event that there are no revisions after the Transportation Authority's annual review, notify the Department in writing on or before March first of each year.

(c) Provide an immediate update of the SSP at any time an update is requested by the Department.

(5) The Department may perform inspections, investigations and reviews of the operation and maintenance of the Transportation Authority's rail fixed guideway system

to determine whether the actual security procedures of the Transportation Authority comply with the SSP.

151.05 Internal Safety and Security Audits Process

(1) The Transportation Authority shall perform planned and scheduled safety and security audits to evaluate its own compliance and measure the effectiveness of the SSPP and the SSP. The Transportation Authority shall notify the Department seven days before each such audit is begun. The audits must be in conformance with the American Public Transit Association (APTA) Manual's Checklist Number 9, (and updates thereto).

(2) The Transportation Authority's internal safety or security audit shall:

(a) Be performed by qualified personnel;

(b) Be recorded on a written checklist approved by the Department

(c) Assess the activity under audit for compliance with the SSPP.

(d) Require any CAPs which result from an audit be submitted to the Department in writing within 30 days of the completion of the audit.

(e) Require that all CAPs be reviewed by the Department.

(f) Provide that on receipt of the Transportation Authority's final audit report, if CAPs are included, the Department has ten days in which to accept or reject the CAP in writing. If the Department rejects the CAP, the Transportation Authority has 20 days to submit a revised CAP to the Department. A reasonable extension of time, if warranted beyond the 20 days, may be granted, by the Department.

(g) Report to the Department, using the Department's CAP identification number, when the requirements of an accepted CAP have been satisfied.

(3) Qualifications for Auditors:

(a) An auditor may be a manager of the activity under audit.

(b) An auditor may not be the supervising manager of the activity

under audit.

(4) The Transportation Authority shall file with the Department on or before February 15 of each year, an annual report of each internal safety and security audit conducted during the past calendar year. The report shall state the results of each audit in terms of the adequacy and effectiveness of the SSPP and the SSP.

(5) The Department will provide a checklist titled, DTE Checklist For Review of Annual Internal Audit Reports which is a list of requirements for the annual internal audit reports. The Department shall witness the Transportation Authority's internal audit activities, in whole or on a sample basis, and will monitor the internal audit program.

151.06 Hazardous Conditions and Accidents

(1) Hazard Categorization:

(a) Hazard Severity is a subjective measure of a credible mishap resulting from personnel error, environmental conditions, design inadequacies, and/or procedural deficiencies for system, subsystem, or component failure or malfunction, categorized as follows:

1. Catastrophic--Death or system loss.

2. Critical--Severe injury, severe occupational illness, or major

system damage.

3. Marginal--Minor injury, minor occupational illness, or minor system damage.

4. Negligible--Less than minor injury, minor occupational illness, or minor system damage.

(b) Hazard Probability is the probability that a specific hazard will occur during the planned life expectancy of the system element, subsystem, or component. It can be described subjectively in potential occurrences per unit, events, population, items, or activity as follows:

1. Frequent--Likely to occur frequently to individuals, or continuously experienced in equipment.

2. Probable--Likely to occur several times in the life of an item.

3. Occasional--Likely to occur sometime in the life of an item.

4. Remote--Unlikely but possible to occur in the life of an item.

5. Improbable--Unlikely to occur.

(c) A hazard matrix is an indicator of the correlation among the four categories of severity of conditions that may endanger human life or property and the five patterns of frequency of the occurrence of the hazardous condition. The matrix classifies the degree of risk, and also provides a guideline for reporting of an occurrence and subsequent action for hazard resolution.

Hazard Matrix

	Catastrophic	**Critical**	**Marginal**	**Negligible**
Frequent	**UNACCEPTABLE**	**UNACCEPTABLE**	**UNACCEPTABLE**	Acceptable**
Probable	**UNACCEPTABLE**	**UNACCEPTABLE**	UNDESIRABLE	Acceptable**
Occasional	**UNACCEPTABLE**	UNDESIRABLE	UNDESIRABLE	ACCEPTABLE
Remote	UNDESIRABLE	UNDESIRABLE	Acceptable**	ACCEPTABLE
Improbable	Acceptable**	Acceptable**	Acceptable**	ACCEPTABLE

Acceptable** means acceptable based on prior management decision.

(2) Based on the foregoing matrix, the Transportation Authority shall file notice of the existence of hazardous conditions in the following manner:

(a) All frequent, probable, or occasional catastrophic or critical occurrences or conditions must be reported to the Department by telephone/electronic communications, within two to four hours of the occurrence of the accident or hazardous condition, and be reported in writing by the next business day on a form approved by the Department.

(b) All frequent, marginal occurrences must be reported to the Department by telephone within 24 to 48 hours, and be reported in writing on a form approved by the Department within five days of the occurrence of the accident or hazardous condition.

(c) All undesirable occurrences must be reported to the Department

in writing on a form approved by the Department within five days of the occurrence of the accident or hazardous condition.

(3) In addition to the foregoing matrix, The Transportation Authority shall file notice of any occurrence categorized by the following codes (as listed in the MBTA Manual of Operations) or Other Codes as may be determined by the Department:

Code 1- Fire or smoke

Code 2- Person under a train

Code 3- Train or car derailed

Code 6- Unusual occurrence

Code 7- Bomb threat

(4) Notification shall be served on the Department Inspector assigned to the Transportation Authority or the Department's Transit Engineer. If the Inspector or the Transit Engineer cannot be contacted, notification shall be served on the Assistant Director of the Transportation Division.

(5) Notification process by the Transportation Authority to the Department shall include, but not be limited to :

(a) Name and Title of person reporting

(b) Location of condition

(c) Time and date of discovery of condition

(d) Description of condition

(e) Casualties

(f) Property damage estimate

- Name and telephone number of person from whom additional

information may be obtained.

(6) After initial notification, the Department may require the Transportation Authority to conduct further activities in order to provide more detailed information.

151.07 Investigation of Accidents and Unacceptable Conditions

(1) The Transportation Authority may conduct an on site investigation of the occurrence of every accident and every unacceptable hazardous condition. The Department will provide, and the Transportation Authority will use D.T.E. Checklist Form A for this investigation.

(2) The Investigation shall include:

(a) On-site inspection

(b) Visual examination and measurements

(c) Examination by the following methods and/or tests:

1. radiographic,

2. ultrasonic,

3. magnetic particle,

4. liquid dye testing,

(d) Functional testing of:

1. vehicle,

2. track,

3. traction power,

4. signals and/or,

5. communication equipment,

(e) Interviews with witnesses,

(f) Review of maintenance records and procedures,

(g) Review of employee training and certification,

(h) Photographs,

(i) Police and coroner reports,

(j) Review of alcohol and drug test results,

(k) Review of hours of service records,

(l) Review of operating rules and procedures, and/or

(m) Other related matters.

(3) The Transportation Authority shall prepare a preliminary written report of its investigation. The Department may request a review of data used by the Transportation Authority in the preparation of its reports. The preliminary report shall specify:

(a) The probable cause of the accident and/or hazard,

(b) Any contributory cause of the accident and/or hazard,

(c) A corrective action plan,

(d) A schedule for prevention of accidents or mitigation of hazard,

(e) A schedule for implementation of corrective action, and/or

(f) Other related matters.

(4) The Transportation Authority shall submit to the Department the final report of such investigation within 30 days of the last day of the month of the occurrence.

(a) The final report shall identify:

1. accident and/or

2. unacceptable hazardous condition

3. CAP resolution reported on D.T.E. Form B

4. time frame for resolution

5. agency responsible for resolution

6 personnel responsible for resolution

7. estimated cost of resolution

(b) In the event that the Transportation Authority does not file its final report as provided in 220 CMR 151.07(4)(a), the Transportation Authority shall submit to the Department a bi-weekly written status report of any investigation not completed within 60 days of the occurrence.

(c) On receipt of the Transportation Authority's final report and the CAP the Department has ten days in which to accept or reject the plan in writing. If the Department rejects the CAP, the Transportation Authority has 20 business days to submit a revised CAP to the Department. A reasonable extension of time, if warranted beyond the 20 days, may be granted, by the Department.

(5) The Department may investigate the Transportation Authority's compliance with the requirements of 220 C.M.R. 151.06(2) and (3) and issue any Orders that it deems necessary.

(6) Investigation reports and corrective action plans prepared by the Transportation Authority and filed with the Department shall not be admissible as evidence in any civil action for damages based on or arising out of matters covered therein, unless specifically authorized by the Department.

151.08: Track Inspection

(1) Inspections.

(a) All inspections must be made according to the schedule set out in 220 C.M.R. 151.08(2), by a person designated under 220 C.M.R. 151.08(4).

(b) Each inspection must be made on foot or by riding over the track in a

vehicle at a speed that allows the person making the inspection to visually

inspect the track structure for compliance with 220 C.M.R. 151.00. However, mechanical, electrical and other track inspection devices may be used to supplement visual inspection. If a vehicle is used for visual inspection, the speed of the vehicle may not be more than five miles per hour when passing over track crossings, highway crossings or turnouts.

(c) If the person making the inspection finds a deviation from the inspection requirements the inspector shall immediately initiate remedial action.

(2) Schedule for Track.

(a) Each track inspection must be made according to the following schedule:

TYPE OF TRACK	REQUIRED FREQUENCY

Light Rail Track	Three times per week with at least one calendar day interval between inspections
Rapid Transit Lines-main track and sidings with posted operating speeds of 40 mph or less	Weekly with at least three calendar days interval between inspections, or before use, if track is used less than once a week, or twice weekly with at least one calendar day interval between inspections if track carries passenger trains or carried more than ten million gross tons of traffic during preceding calendar year.
All Rapid Transit Lines with posted operating speed greater than 40 mph	Twice weekly with at least one calendar day interval between inspections.

- In addition to 220 C.M.R. 151.08(2)(a), any track undergoing or

awaiting repair that has a speed restriction placed on it shall be inspected at a frequency that will insure safe operations at all times.

- Each switch, turnout, and track crossing must be inspected on foot at

least monthly. In the case of track that is used less than once a month, each switch turnout, and track crossing must be inspected before it is used.

(d) In the event of fire, flood, severe storm, or other occurrence which might have damaged track structure, a special inspection must be made of the track involved as soon as possible after the occurrence.

(e) The Department of Telecommunications and Energy may require inspections at more frequent intervals in areas of dense traffic, high operating speed or questionable physical conditions.

(3) Schedule for Rail Inspection.

(a) In addition to 220 C.M.R. 151.08(2)(a), at least once a year a continuous search for internal defects must be made of all rail in all track with operating speeds greater than 40 mph.

(b) Inspection equipment must be capable of detecting defects between

joint bars, in the area enclosed by joint bars.

(c) Each defective rail must be marked with highly visible marking on

both sides of the web and base.

(4) Personnel.

(a) The Transit Authority shall designate qualified persons to

supervise restorations and renewals of track under traffic conditions. Each person designated must have:

1. Experience/Education

a. One year of supervisory experience in railroad track maintenance, or

b. A combination of supervisory experience in track maintenance and training from a course in track maintenance, or

c. A college level educational program related to track maintenance.

2. Ability to:

a. Understand inspection requirements

b. Detect deviations from the inspection requirements

c. Prescribe appropriate remedial action to correct or safely

compensate for deviations

d. Procure written authorization from the Transit Authority to prescribe remedial actions to correct or safely compensate for any deviations from the inspection requirements

- The Transit Authority shall designate qualified persons to inspect track

for defects. Each person designated must have:

1. Experience/Education

a. At least one year of experience in track inspection, or

b. A combination of experience in track inspection and training from a course in track inspection or from a college level educational program related to track inspection.

2. Ability to:

a. Understand inspection requirements

b. Detect deviations from the inspection requirements

c. Prescribe appropriate remedial action to correct or safely

compensate for deviations

d. Procure written authorization from the Transit Authority to prescribe remedial actions to correct or safely compensate for any deviations from the inspection requirements pending review by a qualified person designated under 220 C.M.R. 151.08(4)(a).

- Personnel Records of designees under 220 C.M.R.151.08(4)(a) and (b)

shall show:

1. The basis for each designation

2. The records of inspections made by each person designated.

3. Records must be kept available for inspection or copying by the

Department of Telecommunications and Energy.

- Records/Reports.

(a) The Transit Authority shall keep a record of each track and rail inspection required to be performed.

(b) The Transit Authority shall designate a location where each original record shall be maintained for at least one year after the track inspection covered by the track inspection record. The Transit Authority shall retain a rail inspection record for at least two years after the rail inspection and for one additional year after remedial action is taken.

(c) Track Inspection Records and Rail Inspection Records shall be:

1. Prepared on the day the inspection is made

2. Signed by the person making the inspection.

(d) Inspection Records must specify:

1. The track or rail inspected

2. The date of inspection

3. Location of any deviation

4. Nature of any deviation from the track or rail inspection requirements

5. Remedial action taken by the person making the inspection

(e) Records must be kept available for inspection or copying by the Department of Telecommunications and Energy.

151.09: Track Maintenance

- Unless otherwise structurally supported, all track must be supported by ballast

material which will:

(a) Transmit and distribute the load of the track and railroad rolling equipment to the subgrade

(b) Restrain the track laterally, longitudinally, and vertically under dynamic loads imposed by railroad rolling equipment and thermal stress exerted by the rails

(c) Provide adequate drainage for the track

(d) Maintain proper track crosslevel, surface, and alignment.

(2) Crossties shall be made of a material to which rail can be securely fastened.

(a) Each 39 foot segment of track shall have a sufficient number of crossties which in combination provide effective support that will maintain gage, surface, and alignment.

(b) The minimum number and type of crossties specified in 220 CMR 151.09(3) effectively distributed to support the entire segment; and at least one crosstie of the type specified in 220 C.M.R. 151.09(3) that is located at a joint location.

- Each 39 foot segment of track shall have the minimum number and type of

crossties as indicated in the following table:

MAXIMUM TRACK SPEED	MINIMUM NUMBER OF TIES
Passenger- 15 miles per hour	5
Passenger- 60 miles per hour	8

Crossties required shall be of the type which are not:

(a) Broken through

(b) Split or otherwise impaired to the extent the crossties will allow the ballast to work through, or will not hold spikes or rail fasteners

(c) So deteriorated that the tie plate or base of rail can move laterally two inches relative to the crossties, or

(d) Cut by the tie plate through more than 40% of a tie's thickness

(e) For track constructed without crossties, such as slab track, track connected directly to bridge structural components and track over servicing pits, the track structure must meet the requirements of 220 C.M.R. 151.09(3) in regards to gage restraint, rail support, surface and alignment.

(4) Gage is measured between the heads of the rails at right-angles to the rails in a plane of an inch below the top of the rail head for standard rail construction, or ¼ of an inch below the top of the rail head for light rail transit.

(5) Gage must be within the limits prescribed in the following table:

SPEED OF TRACK	GAGE MUST BE AT LEAST	GAGE MUST BE NOT MORE THAN
Passenger- 15 mph	4'8"	4'10"
Passenger- 60 mph	4'8"	4' 9 ¾"

(6) Each rail joint, insulated joint, and compromise joint must be of the proper design and dimensions for the rail on which it is applied.

(7) If a joint bar is cracked, broken, or because of wear allows excessive vertical movement of either rail when all the bolts are tight, it must be replaced.

(8) If a joint bar is cracked or broken between the middle two bolt holes it must be replaced.

(9) In the case of conventional jointed track, each rail must be bolted with at least

one bolt for speeds up to ten mph, and with at least two bolts for speeds above ten mph.

(10) In the case of continuous welded rail track, each rail must be bolted with at least two bolts at each joint.

(11) Each joint bar must be held in position by track bolts tightened to allow the joint bar to firmly support the abutting rail ends and to allow longitudinal movement of the rail in the joint to accommodate expansion and contraction due to temperature variations.

Regulatory Authority: 220 C.M.R. 151.00, 49 U.S.C. 5330, 49 C.F.R. 659.

1. Effective January 1, 1998.